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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER


ANDUJAR, LEONARDO

ART UNIT PAPER NUMBER

2826

DATE MAILED: 03/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/751,214	<b>Applicant(s)</b> NEOGI ET AL.	
	<b>Examiner</b> Leonardo Andújar	<b>Art Unit</b> 2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 06/20/2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-3, 5-13, 15-23 and 25-27 is/are pending in the application.
- 4a) Of the above claim(s) 15-22 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5-13, 23 and 25-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 08/30/2004 has been entered. Accordingly, pending in this Office action are claims 1-3, 5-13, 15-23 and 25-27.

### ***Election/Restrictions***

2. Applicant's election without traverse of Group I (device claims) in Paper No. 6 is acknowledged. Therefore, claims 15-22 are withdrawn from further consideration as being drawn to a non-elected invention.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

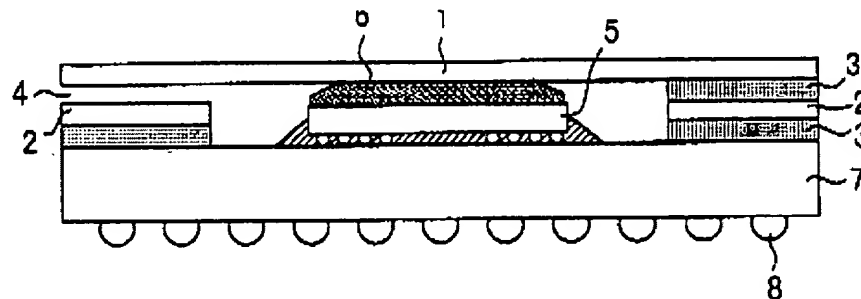
A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 2, 6, 9, 13, 23, 25 and 27 are rejected under 35 U.S.C. 102(e) as being anticipated by Matsushima (US 6,232,652).

5. Regarding claims 1 and 23, Matsushima (e.g. figs. 1, 2) shows a package comprising:

- A substrate 7 with an inner surface to which a die 5 is to be attached, forming electrical connections 10 through the substrate, between the die and the exterior of the package;
- A lid 1 with an inner surface facing the inner surface of the substrate;
- Thermal attach 6 disposed between the die and the inner surface of the lid;
- And sealant 3 disposed between the substrate and the lid to bond the lid to the substrate wherein the sealant includes at least one break (slit 4) remaining subsequent to the substrate and lid assembled together (col. 3/lls. 47-50).



6. Regarding claim 2, Matsushima teaches that the package is a ball grid array package.

7. Regarding claims 6 and 25, Matsushima shows that sealant is disposed between the lid and the substrate is a substantially rectangular patter with at least one break.

8. Regarding claim 9, Matsushima shows that the rectangular pattern has four breaks, one in each corner of the substantially rectangular pattern (e.g. fig. 3).

9. Regarding claims 13 and 27, Matsushima teaches that the die attached to the substrate using controlled collapsed chip connections.

***Claim Rejections - 35 USC § 103***

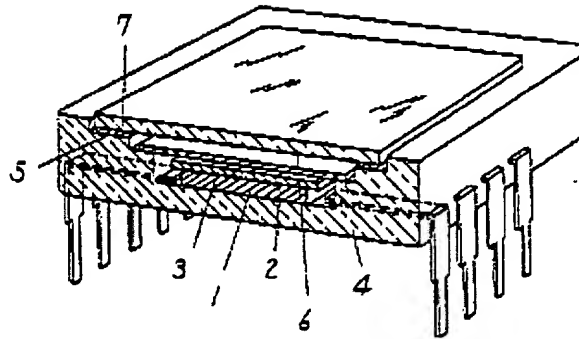
10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 1-3, 6, 9, 13, 23, 25 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hideyo (JP-63084051 cited by applicant) in view of Matsushima (US 6,232,652).

12. Regarding claims 1, 3 and 13, Hideyo shows most aspects of the instant invention including a package comprising:

- A substrate 4 with an inner surface to which a die 1 is to be attached, forming electrical connections (pin grid array) through the substrate, between the die and the exterior of the package;
- A lid 6 with an inner surface facing the inner surface of the substrate;
- Thermal attach 2 disposed between the die and the inner surface of the lid;
- And sealant 7 disposed between the substrate and the lid to bond the lid to the substrate wherein the sealant includes at least one break (slit 8).



However, Hideyo does not disclose that the at least one break remains subsequent to the substrate and lid assembled together. Nevertheless, Matsushima teaches a package comprising a sealant 3 disposed between a substrate 7 and a lid 1 to bond the lid to the substrate wherein the sealant includes at least one break (slit 4) that remains after the substrate and the lid were assembled together (col. 3/lls. 47-50). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a sealant having at least one break that remains after the substrate and lid were assembled together in Hideyo's invention to prevent cracking of the substrate and disconnection of the internal wiring which may caused a semiconductor device deformation as suggested by Matsushima (col. 4/lls. 15-50).

13. Regarding claim 2, Matsushima teaches that the package is a ball grid array package.

14. Regarding claims 6 and 25, Matsushima shows that sealant is disposed between the lid and the substrate is a substantially rectangular pattern with at least one break.

15. Regarding claim 9, Matsushima shows that the rectangular pattern has four breaks, one in each corner of the substantially rectangular pattern (e.g. fig. 3).

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16. Regarding claims 13 and 27, Matsushima teaches that the die attached to the substrate using controlled collapsed chip connections.

17. Claims 7, 8, 10 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsushima (US 6,232,652).

18. Regarding claims 7 and 26, Matsushima shows most aspects of the instant invention including a sealant with four breaks. However, Matsushima does not disclose sealant has one break in each side of the substantially rectangular pattern (e.g. fig. 3). Nonetheless, this limitation, absent any criticality, is only considered to be an obvious modification of the shape of the sealant pattern disclosed by Prior Art as the courts have held that a change in shape or configuration, without any criticality, is within the level of skill in the art as the particular shape claimed by applicant is nothing more than one of numerous shapes that a person having ordinary skill in the art will find obvious to provide using routine experimentation based on its suitability for the intended use of the invention. See In re Dailey, 149 USPQ 47 (CCPA 1976).

19. Regarding claim 8, Matsushima discloses most aspects of the instant invention including a rectangular pattern having four breaks, one in each side of the substantially rectangular. Matsushima does not explicitly disclose that the four breaks comprise a minimum 10% of the rectangular pattern. Nonetheless, the specification contains no disclosure of either the critical nature of the claimed arrangement or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical. In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934,

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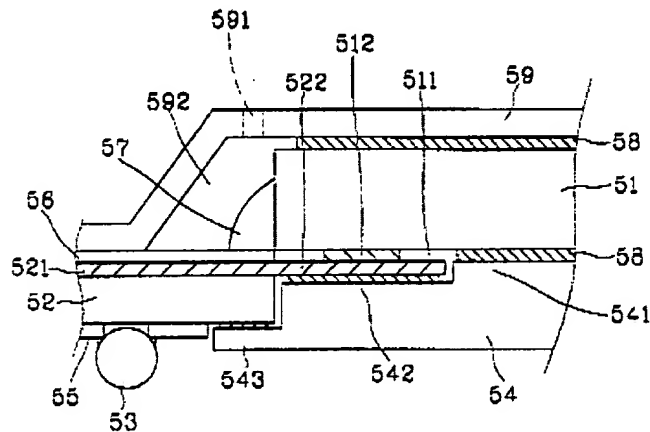
1936 (Fed. Cir. 1990). The specific length of the break claimed by applicant, i.e., a minimum 10% of the rectangular pattern, absent any criticality, is only considered to be the "optimum" length of the break pattern disclosed by the Prior Art that a person having ordinary skill in the art would have been able to determine using routine experimentation based, among other things, on the desired accuracy, manufacturing costs, etc. (see *In re Boesch*, 205 USPQ 215 (CCPA 1980)).

20. Regarding claim 10, Matsushima discloses most aspects of the instant invention including a rectangular pattern having four breaks, one in each corner of the substantially rectangular pattern. Matsushima does not explicitly disclose that the four breaks comprise a minimum 10% of the rectangular pattern. Nonetheless, the specification contains no disclosure of either the critical nature of the claimed arrangement or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical. In *re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990). The specific length of the break claimed by applicant, i.e., a minimum 10% of the rectangular pattern, absent any criticality, is only considered to be the "optimum" length of the break pattern disclosed by the Prior Art that a person having ordinary skill in the art would have been able to determine using routine experimentation based, among other things, on the desired accuracy, manufacturing costs, etc. (see *In re Boesch*, 205 USPQ 215 (CCPA 1980)).



21. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsushima (US 6,232,652) in view of Chen et al. (US 6,215,180).

22. Regarding claim 5, Matsushima shows most aspects of the claimed invention except vent holes formed through the lid. Nevertheless, Chen (e.g. fig. 6) shows a semiconductor device having vent holes 591 formed through the lid 59. According to Chen the apertures 591 may enable moisture trapped in the package interior escaping out of the package to avoid possible pop corn effect (col. 5/lls. 25-27).



It would have been obvious to one of ordinary skill in the art at the time the invention was made to form vent holes through the lid disclosed by Matsushima in order to enable moisture trapped in the package interior escaping out of the package to avoid possible pop corn effect as taught by Chen.

23. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsushima (US 6,232,652) in view of Harper.

24. Regarding claims 11 and 12, Matsushima discloses most aspects of the instant invention including a wiring substrate 7. Matsushima does not disclose the specific

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material used to make the substrate such as an organic material. Harper discloses that polyimides (organic and insulating) are extensively used in the electronic industry (i.e. multiplayer circuit board, chip carrier, laminates, flexible circuits etc) because they have good heat resistance and good electrical properties at high temperatures (page 1.9). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the Matsushima's substrate of polyimide (organic and insulating) in order to provide an insulating material having good heat resistance and good electrical properties at high temperatures as taught by Harper. Although Matsushima further in view of Harper does not explicitly disclose that the polyimides is susceptible of absorbing moisture and to release it as steam causing a pressure increase inside the package this phenomena is implicit in their teachings. Note that it is a scientific fact (inherent) that polyimides are capable of absorbing moisture and are capable to release it as steam when the temperature is increased (e.g. during soldering) hence causing an increment of the package inner pressure.

### ***Response to Arguments***

25. Applicant's arguments filed 08/30/2004 have been fully considered but they are moot in view of a new ground of rejection.

### ***Conclusion***

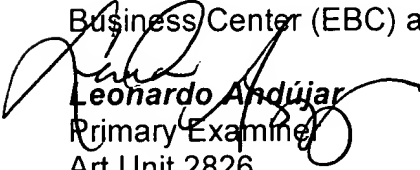
26. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonardo Andújar whose telephone number is 571-272-1912. The examiner can normally be reached on Mon through Thu from 9:00 AM to 7:30 PM EST. If attempts to reach the examiner by telephone are unsuccessful, the

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examiner's supervisor, Nathan J. Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

27. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).



Leonardo Andujar  
Primary Examiner  
Art Unit 2826